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(54) APPARATUS FOR COMPACTING & INTRODUCING WASTE INTO A COLLECTING CONTAINER

(71) NORBA AKTIEBOLAG
(72) DAHLIN, A.B.I.
(74) SF

(57) CLAIM 1. Apparatus for introducing waste in particular into a collecting container, or the like, arranged e.g. on a vehicle, comprising a load hopper having an inlet opening for receiving the waste, means for transferring the waste to the collecting container through an outlet opening characterized in that said means comprise a pair of gripping members located in said load hopper, and means for moving said gripping members substantially synchronously and in a common plane, towards and away from the collecting container, as well as towards and away from each other, substantially perpendicularly to their first-mentioned movement, said gripping members being adapted to grip and to compress the portion of waste between themselves and forward it to the collecting container.

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FORM 9

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

Convention Application for Patent

86,966/75

We NORRA ARTIKELAG

500,471

of S-384 01 Blomstermåla 1, Sweden

hereby apply for the grant of a Patent for an invention entitled

"APPARATUS FOR INTRODUCING WASTE OR THE LIKE INTO A COLLECTING CONTAINER"

which is described in the accompanying complete specification.
This application is a Convention Application and is based on the application numbered 7415348-7

for a patent or similar protection made in Sweden

AUSTRALIAN
26 NOV 1975
PATENT OFFICE

on 9th December, 1974

My/Our address for service is:

Care: SPRUSON & FERGUSON
PATENT ATTORNEYS
ESSO HOUSE, 127 KENT STREET
SYDNEY. NEW SOUTH WALES.
AUSTRALIA.

Fee Stamps to value of $ 40.00 attached.

Dated this TWENTY-FIRST day of NOVEMBER 1975

NORRA ARTIKELAG

By: [signature]
Signature of Applicant

Registered Patent Attorney

To:
The Commissioner of Patents

FORM 8 COMMONWEALTH OF AUSTRALIA PATENTS ACT 1952-69

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT OR PATENT OF ADDITION

In support of the Convention Application made for a

~~patent~~ ~~patent of addition~~ for an invention entitled 86,966/75

APPARATUS FOR HETEROPICKS MADE OF THE LIKE INTO A CORRECTING CONTAINER

Full name and address of Declarant.

I, Erik Ahlström,

of 21, Myntgatan, S-552 57 Jönköping, Sweden

do solemnly and sincerely declare as follows:—

~~1. I am~~ ~~the applicant for the~~ ~~patent~~ ~~patent of addition~~

(or, in the case of an application by a body corporate)

1. I am authorised by NORRA ARTIEBOLAG

the applicant for the ~~patent~~ ~~patent of addition~~ to make this declaration on its behalf.

Given country and date of basic application and name of foreign applicant.

2. The basic application as defined by Section 141 of the Act was made in Sweden on the 9th day of December 19 74 by

NORRA ARTIEBOLAG

~~3. I am the actual inventor of the invention referred to in the basic application.~~

(or where a person other than the inventor is the applicant)

Full name and address of inventor(s)

3. Åke Bertil Ingemar Dahlin

131, Storgatan,

of S-384 00 Blomstermåla, Sweden

AUSTRALIAN
26 NOV 1975
PATENT OFFICE

is the actual inventor of the invention and the facts upon which the applicant is/~~are~~ entitled to make the application are as follows:

Deed of Assignment of November 29, 1974 from the actual inventor to the said Applicant

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

Declared at Jönköping this 12th day of November 1975

Signature of Declarant — Erik Ahlström
Patent Attorney

To:
The Commissioner of Patents.

SPRUSON & FERGUSON, SYDNEY

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

Form 10

COMPLETE SPECIFICATION

(ORIGINAL) 86,966/75

FOR OFFICE USE :

Class Int. Class

Application Number :
Lodged :

Complete Specification Lodged :
Accepted :
Published :

Priority :

Related Art :

[illegible] document contains the [illegible] made under [illegible] and is correct for printing.

[illegible]

500,4[illegible]

Name of Applicant : SOREA ARTIKOLAG

Address of Applicant : S-384 01 Blomstermåla 1, Sweden

Actual Inventor : ÅKE ERNST ERNFRID SAHLIN

AUSTRALIAN
26 NOV 1975
PATENT OFFICE

Address for Service : Spruson & Ferguson, Patent Attorneys, Sola House, 127 Kent Street, Sydney, New South Wales, 2000 Australia.

Complete Specification for the invention entitled :

"APPARATUS FOR INTRODUCING WASTE OR THE LIKE INTO A CRUSHING CHAMBER"

The following statement is a full description of this invention, including the best method of performing it known to [illegible] :

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ABSTRACT OF THE DISCLOSURE

An apparatus for introducing waste or the like into a collecting container is associated with a load hopper adapted to receive the waste, and comprises a pair of gripping members for transferring the waste from the load hopper to the collecting container. The gripping members, which are adapted to grip and to compress consecutive portions of waste between themselves and forward these portions to the collecting container, are movable, preferably synchronously and substantially in a common plane, towards and away from each other, as well as towards and away from the collecting container.

The invention generally relates to an apparatus for introducing waste or refuse into a collecting container or the like arranged e.g. on a vehicle, through a load hopper adapted to receive the waste and comprising means for transferring the waste to the collecting container. Such apparatus of the prior art, as exemplified by the U.S. Patent 2,837,230, comprise a packing plate, which moves in a plane arc backwards over a loading hopper and in so doing cuts off the flow of garbage from a bin or container to the hopper when feeding in a batch of refuse from the hopper into the collecting container during its forward stroke.

A circumstance, which has to be taken into consideration when improving such refuse handling apparatus, is the composition of the waste that is to be handled. Thus, in addition to ordinary and coarser domestic and store waste there is nowadays an increasing rate of industrial waste. Bearing this in mind, the principal object of the invention is to provide a feeding-in apparatus of the kind in question, which

makes possible a more rational and effective handling of such waste in conjunction with removing or transporting away thereof.

A particular object of the invention is to provide a substantially continuously operating feeding-in apparatus, which carries out precompressing, crushing and compacting without cutting off the stream of waste, before the waste or refuse is finally compressed in the collecting container, whereby a rapid introduction in combination with a high degree of compression is made possible.

Accordingly the invention consists in an apparatus for introducing waste in particular into a collecting container or the like arranged e.g. on a vehicle, through a load hopper adapted to receive the waste and comprising means for transferring the waste to the collecting container, characterized in that said means comprise a pair of gripping members, and means for moving said gripping members substantially synchronously, and in a common plane, towards and away from the collecting container, as well as towards and away from each other, substantially perpendicularly to their first-mentioned movement, said gripping members being adapted to grip and to compress the portion of waste between themselves and in conjunction herewith forward it to the collecting container.

Further features and advantages will become apparent from the following detailed description and the annexed drawings, which diagrammatically and as non-limiting example illustrate an embodiment of the invention, which is preferred at present.

Figure 1 of the drawings is a longitudinal section

through the rear part of a refuse collecting van.

Figure 2 is a simplified end view of the load hopper as seen in the direction of the arrow II-II in

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Figure 1.

Figure 3 is a side view corresponding to Figure 1.

Figure 4 is an end view of half of the load hopper on a larger scale as seen in the direction of the arrow IV in Figure 3, to which Figure 4 corresponds.

Figure 5 is a plan view illustrating the two gripping members and their associated parts.

Figures 6-10 are diagrammatic representations of the position of the gripping members during different phases of a cycle of operation.

Figure 11 is a simplified diagram of the pressure fluid system.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the Figures there is shown a collecting container 1, which is arranged on a refuse collecting van and is combined with an emptying hood 2 and a load hopper 3. The emptying hood has an inlet opening 41 (Figures 1 and 3), which may be provided with bin holders 42 for the emptying of larger bins or containers. The load hopper 3 comprises a bottom 4, side walls 5 (Figures 1 and 2), a rear wall 6 having an emptying ramp 7 and an upper part 8 having a breaking edge 9. The bottom 4 and the upper part 8 of the hopper 3 define a feed shaft 11 and are provided with catch projections or teeth 12, which are adapted to disintegrate the refuse and to prevent it from sliding back into the load hopper 3. In its lower portion the inner end of the shaft 11 has an outlet opening 10, which is defined by the bottom 4 (Figures 1 and 5) and opens into the collecting container 1. Just opposite the opening 10 the upper portion of the shaft 11 is provided with a guiding cone 13 (Figures 1, 2, 3), which is adapted to

compress and to guide the refuse on its way into the collecting container 1.

For transferring the refuse from the load hopper 3 into the collecting container 1 there are provided two movable gripping members 14, which are shown in four different positions in Figure 5. These gripping members 14 have the shape of one-armed bell cranks, whose lever portions from an obtuse angle 26 (Figure 5) with each other. At their one outer level and the gripping members 14 are rotatably journalled through stub shafts 17 (Figures 1 and 5) in a pair of sliding blocks 18, which are movable back and forth in individual guide members 19. Two hydraulic pressure fluid motors (piston cylinder + piston with piston rod) 24, which are pivotable on stub shafts 23 and 25, are provided for reciprocating the gripping members 14 and their appurtenant sliding blocks 18 in their guide members 19 (Figures 2 and 5). The gripping members 14 are provided with stub shafts 20, by means of which they are coupled to a second pair of pressure fluid motors 21 (piston cylinder + piston with piston rod), which are hydraulic in the illustrated embodiment and which are pivotally journalled on stub shafts 22 and provided for rotating the gripping members or bell cranks 14. Those surfaces 15 of the respective gripping members 14, which face each other and are located between the vertex and the free end of the bell cranks, are provided with teeth 27, which are intended to improve the refuse holding capability of the gripping members 14.

The circuit diagram of the hydraulic system, by means of which the gripping members 14 are operated, is illustrated in Figure 11. Therein, we find the hydraulic motors 21 and 24,

which are connected to each other and to the other members of the hydraulic system, which are illustrated by conventional symbols, by means of non-referenced conduits. In Figure 11 P is a pump, 28 an oil reservoir, 30 a control valve having three setting positions (left-hand, central and right-hand position in the symbolical Figure), 31 and 36 are flow dividers, 32 and 35 are sequential vavles, 33 and 37 are limit switches and 34 and 38 are pressure governors or switches.

As is diagrammatically illustrated in Figures 6-10 the apparatus described above operates in the following way, the direction of flow of the pressure fluid in Figure 11 being designated by dash-dot arrows when the gripping members move from the position according to Figure 6 to the position according to Figure 7, by solid arrows at the movement from Figure 7 to Figure 8, by dash arrows at the movement from Figure 8 to Figure 9 and by dash-dot-dot arrows at the movement from Figure 9 to Figure 10.

The cycle of operations is supposed to start, when the gripping members 14 are located substantially in the point C in Figure 6, the control valve 30 then being shifted from its central or neutral position shown in Figure 11 to its left-hand position. Then, the pressure fluid flows in the direction of the dash-dot arrows, the pistons in the hydraulic motors 21 in Figure 11 consequently being separated to the position shown therein. Hereby, the gripping members 14 are pivoted clockwise and anti-clockwise, respectively, from each other into the position D illustrated in Figure 7. At a predetermined pressure in the hydraulic system, the sequence valve 32 admits supply of pressure fluid to the upper end of the cylinders of the pressure fluid motors 24 in

Figure 1, so that the pistons move downwards therein. Hereby, the gripping members are transferred from the position D in Figure 7 to the position A in Figure 8. The oil pressure in the hydraulic motors 21 is maintained, so that their pistons have the possibility of moving in both directions under the influence of pressure, as is indicated by the solid double arrows in Figure 11. When the position A in Figures 5 and 8 has been attained and triggers the limit switch 33, the control valve 30 is switched to its right-hand position for initiating the return movement of the pistons in the pressure fluid motors 21, so that the pressure fluid flows in the direction of the dash arrows and the gripping members 14 are displaced in the direction from A to B (Figures 5, 8, 9). Hereby the gripping members 14 seize the refuse or waste with their teeth 27 and carry out the pre-crushing thereof during their movement towards each other. If the gripping members should not reach the position A on account of un-deformable, obstructing refuse objects, the pressure switch 34 initiates the movement from A to B instead of the limit switch 33. When the position B has been attained, the sequence valve 35 initiates, at a set maximum pressure, the flow of the pressure medium in the direction of the dash-dot-dot arrows and the rising movement of the pistons in the pressure fluid motors 24 in Figure 11 through the flow divider 36 for bringing about the movement of the gripping members to the position in Figures 5 and 10. During this movement the refuse is held by the teeth 27 of the gripping members 14, which transfer the refuse through the shaft 11, while compressing the refuse, further compressing thereof being brought about by the projections 12 and the guide

cone 13, before the refuse is introduced through the opening 10 (Figure 5) into the collecting container 1, where it is finally compressed against a press wall 29 (Figures 1 and 2) or the like. During the movement from A to B and at the beginning of the movement from B to C the surfaces 15 are pressed towards each other and thereby a higher compression under an increased force past the breaking edge 9 is attained also by the increase in moment which takes place at the movement and the change of position of the point 22 in relation to G_1 and G_2, respectively, and E_1 and E_3, respectively. Thanks to the fact that the gripping members 14 are designed with the angle 26, the two opposing, vertical surfaces 16 form a transporting and compressing means for further transport and compression of such refuse as has been advanced in the shaft 11 during the preceding cycle of operations, at the movement of the gripping members towards the position shown in Figure 10.

During the movement of the gripping members from B to C oil pressure in the hydraulic motors 21 is maintained with possibility for their pistons to reciprocate or move back and forth under the influence of pressure, as is indicated by the dash-dot-dot double-arrows, until the limit switch 37 or - if the position C should not be reached on account of an undeformable refuse object, which blocks the movement of the gripping members 14 - the pressure switch 38 initiates a new start of the operation cycle described above.

As is evident from the above, the operation cycle of the gripping members 14 is not bound to follow the said points C-D-A-B-C, in that the movement of the gripping members may be obstructed by the refuse, thanks to the fact that the

hydraulic system is so designed that the operation cycle is completed even though the different end positions of the gripping members should not be reached. In this case the hydraulic motor 21 is subjected to a continued pressure by means of a sequence valve 35, which is arranged in such a manner that the piston of the hydraulic motor 21 and its fastening 20 can move outwards and inwards in dependence of the varying load upon the gripping members during their movement from B to C (compare the dash-dot-dot arrows in Figure 11).

By this sytem, where the gripping members can seize the "refuse flow" from the sides at the emptying of large containers, a better mode of operation is attained than by prior devices known up to the present, which comprise a pressing plate, which moves in a plane arc backwards and on account hereof has to "cut off" the flow of garbage from the bin or container before the feeding-in into the collecting container.

The embodiment described above and illustrated in the drawings is, of course, to be regarded merely as non-limiting example and can as to its details be modified in several ways within the scope of the following claims. Thus, the shaft 11 with its upper part 8 and the gripping members 14 with their teeth 27, the latch blocks 12 and the guiding cone 13 may have another shape, and the governing of the gripping members may be accomplished in combination with link movements instead of by means of guides. Furthermore, the illustrated hydraulic equipment may be replaced by another movement system, e.g. by hydraulic or electric motors with pinions and racks or the like. In addition hereto, the feeding-in apparatus according to the invention may be utilized

in connection with stationary compressing systems as well as for other material than waste or refuse, e.g. as a stationary crusher or a transport apparatus for industrial purposes.

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The claims defining the invention are as follows:

1. Apparatus for introducing waste in particular into a collecting container, or the like, arranged e.g. on a vehicle, comprising a load hopper having an inlet opening for receiving the waste, means for transferring the waste to the collecting container through an outlet opening characterized in that said means comprise a pair of gripping members located in said load hopper, and means for moving said gripping members substantially synchronously and in a common plane, towards and away from the collecting container, as well as towards and away from each other, substantially perpendicularly to their first-mentioned movement, said gripping members being adapted to grip and to compress the portion of waste between themselves and ~~in connection herewith~~ forward it to the collecting container.

2. Apparatus according to claim 1, characterized in that the bottom or at least one of the walls of the load hopper is provided with teeth or the like, which are adapted to prevent refuse from taking part in the return movement of the gripping members in the direction away from the collecting container.

3. Apparatus according to claim 1, characterized in that the cross sectional area of the load hopper tapers in the direction of the collecting container to hereby assist in compressing and guiding the refuse.

4. Apparatus according to claim 1, characterized in that the gripping members are adapted to compress refuse, which has been fed out, partly or in whole, through the outlet opening, against a movable wall or the like provided in the collecting container.

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FIG. 1

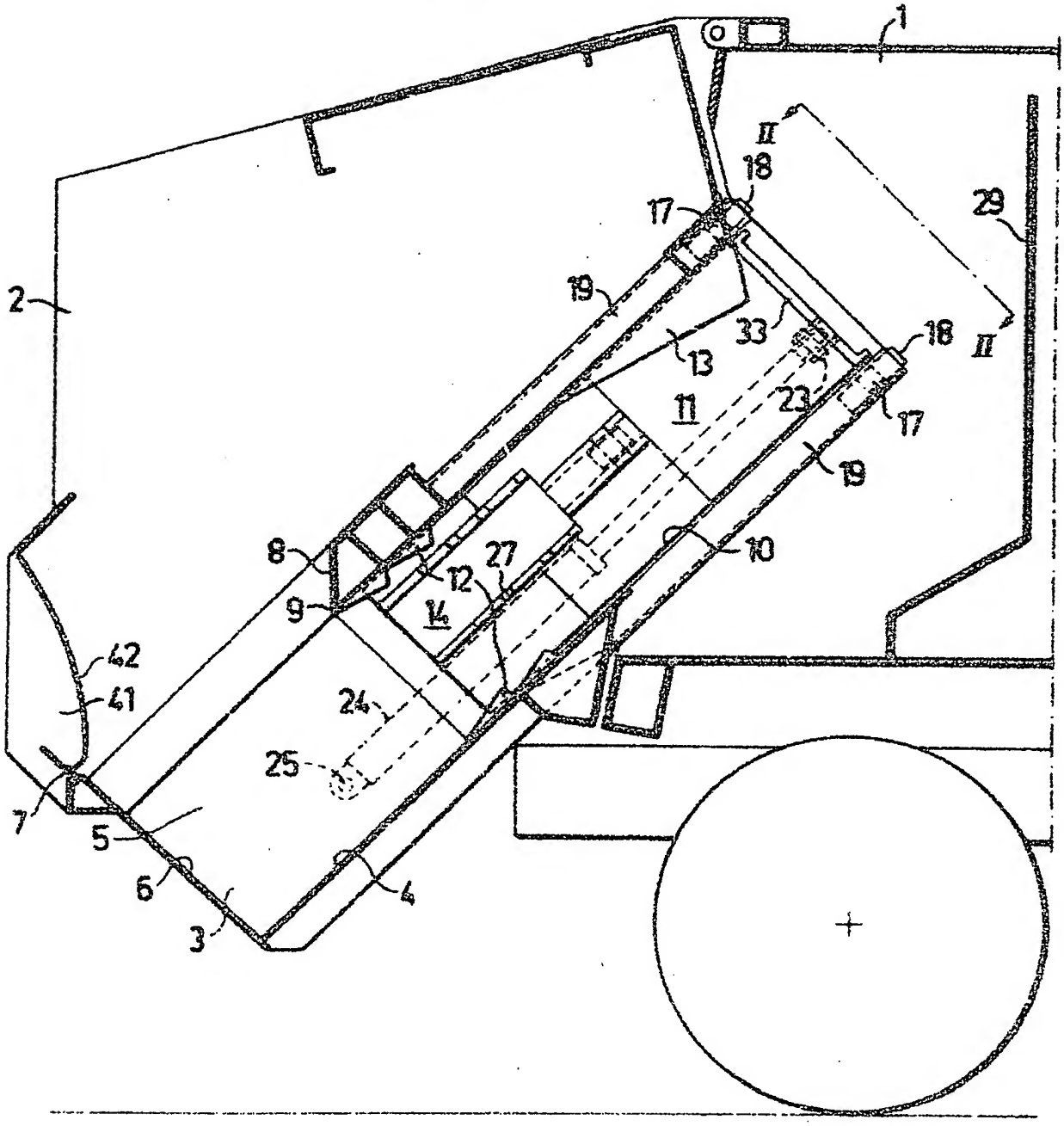

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FIG. 2

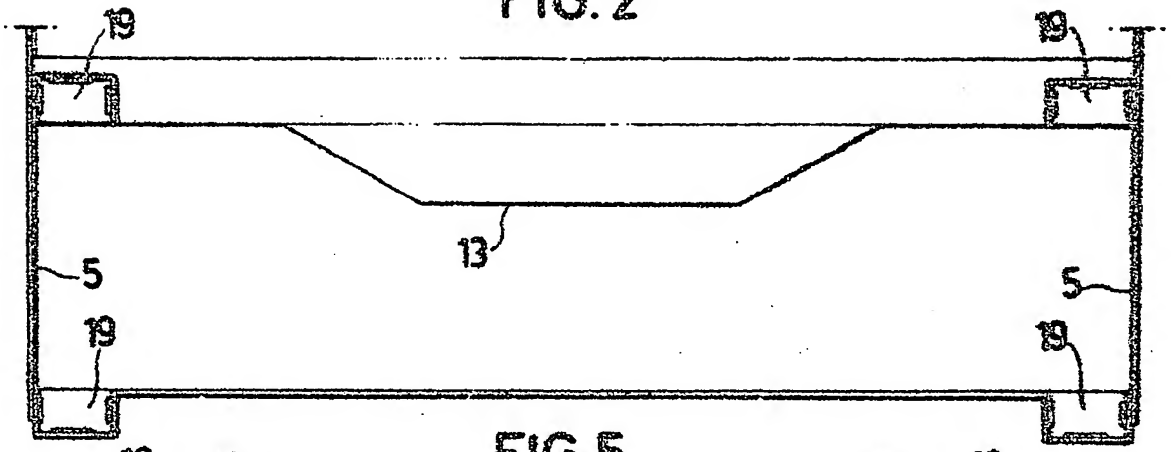

FIG. 5

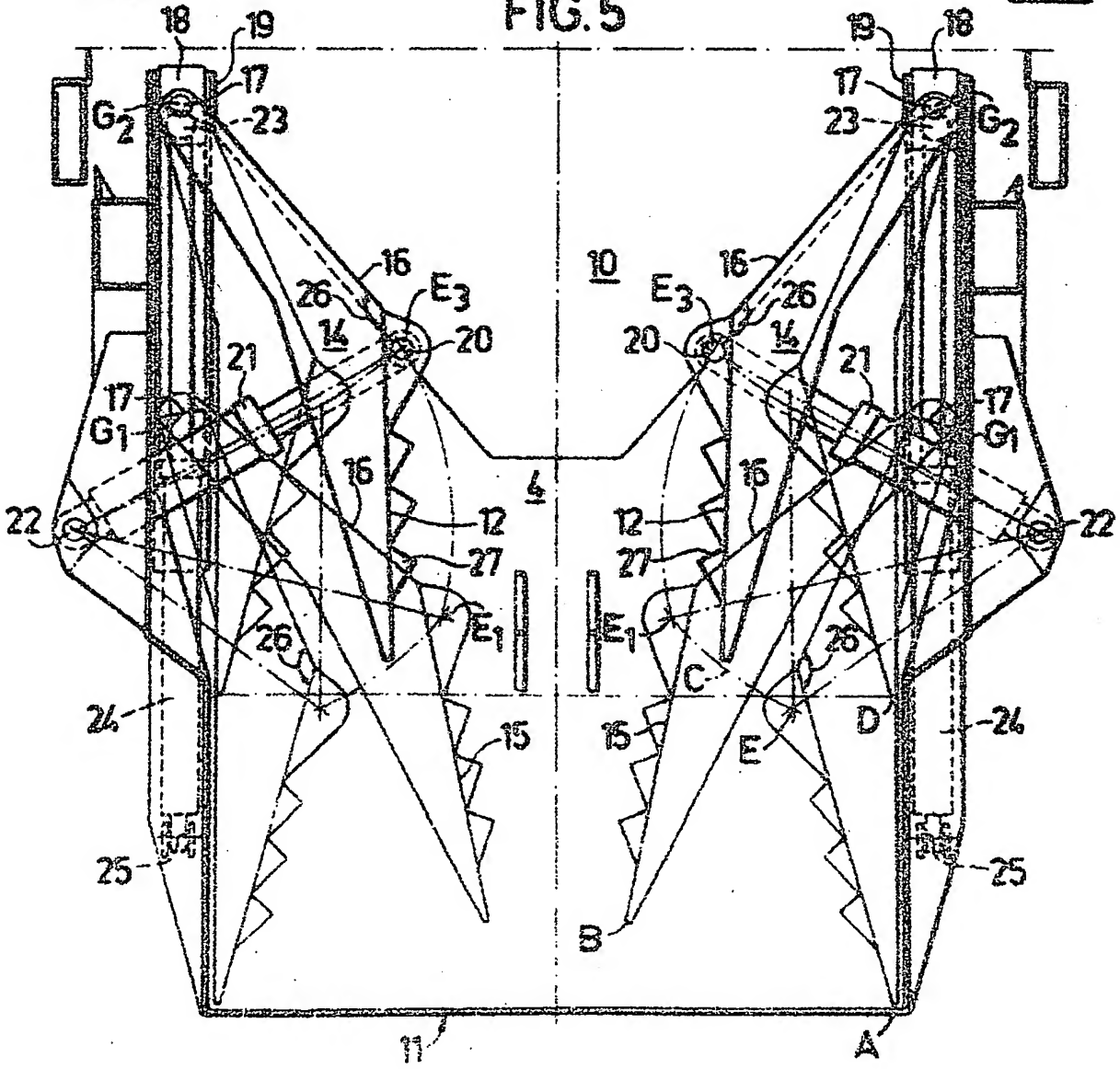

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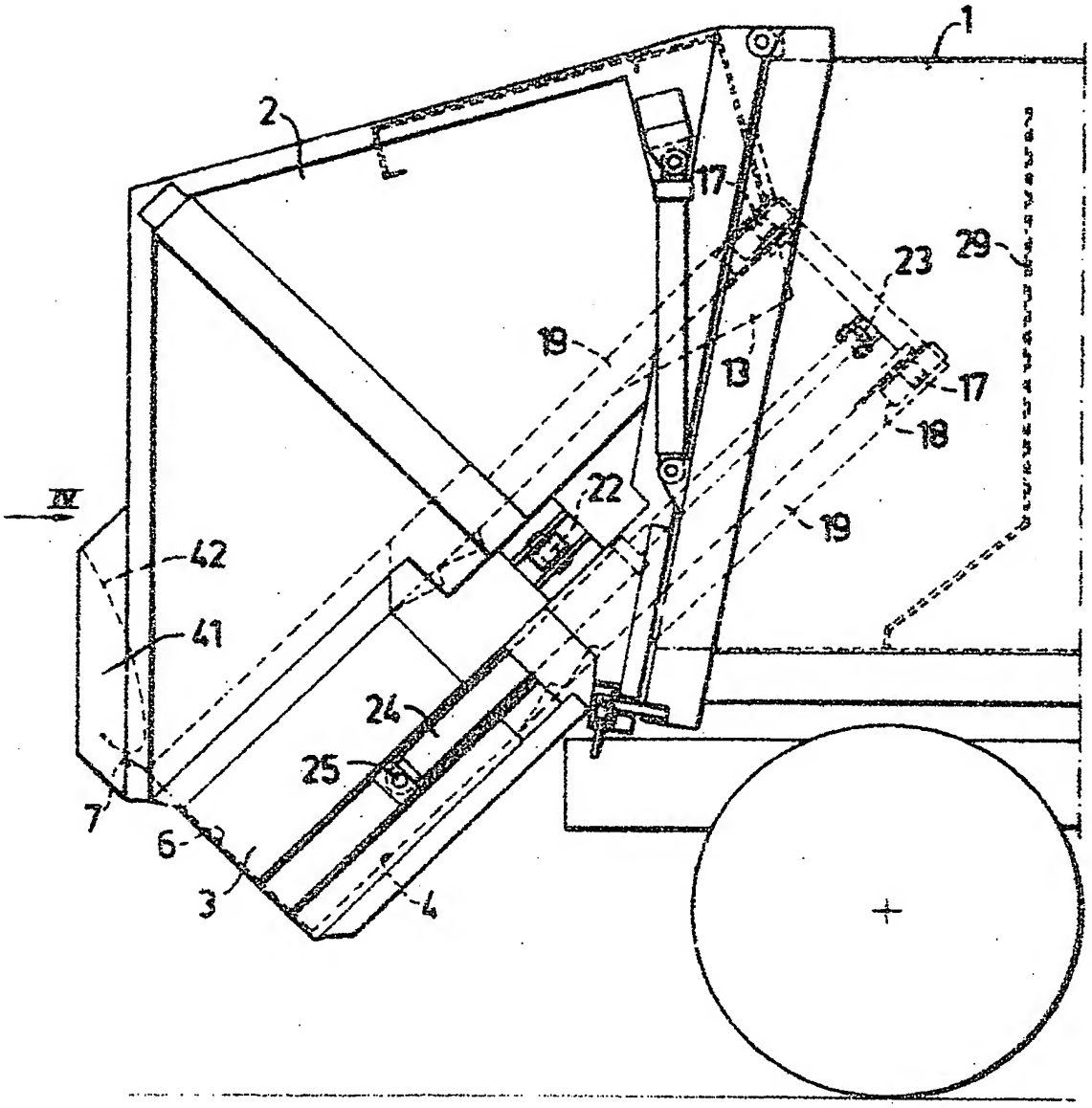
FIG.3



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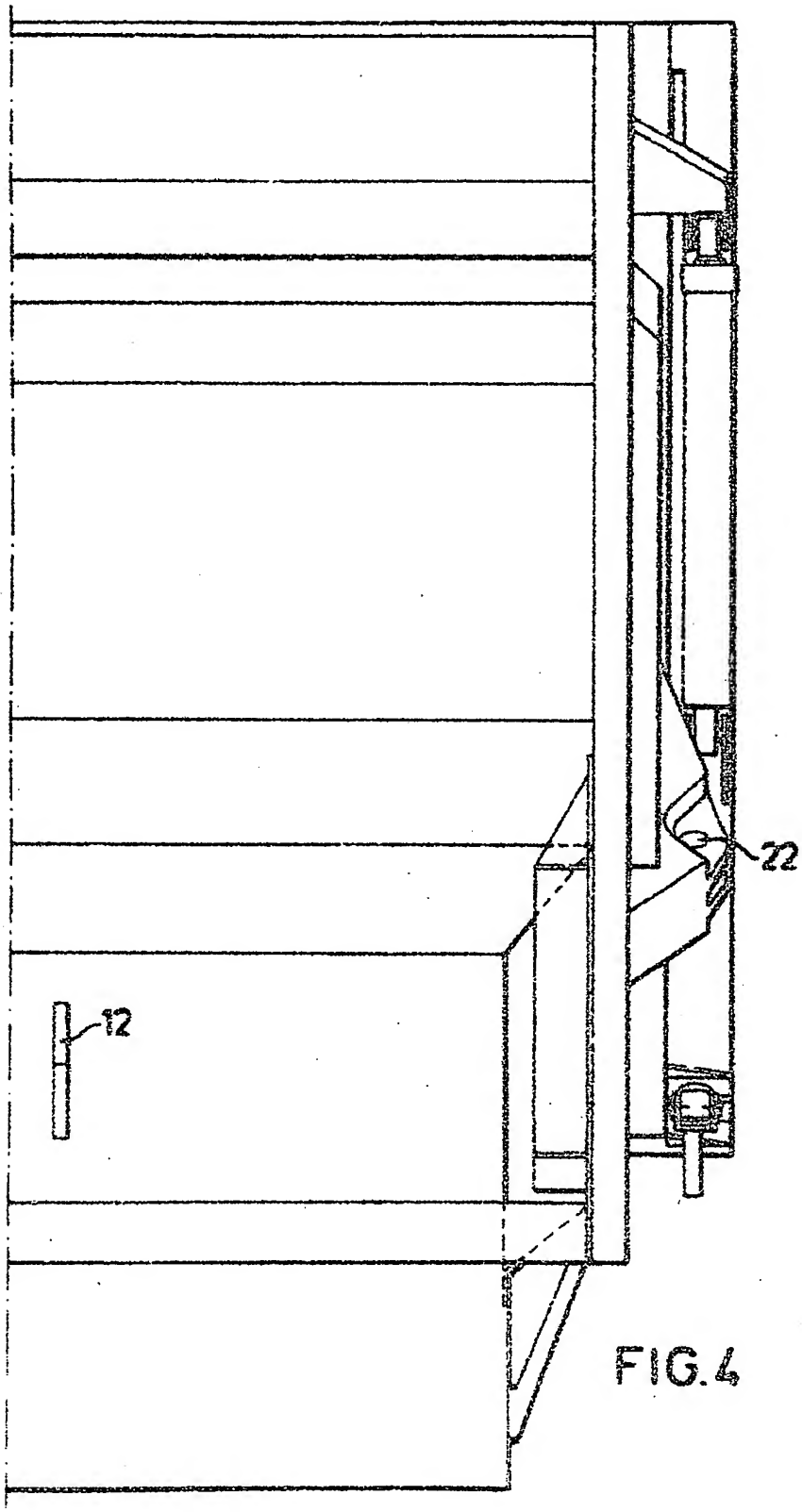


FIG.4

FIG. 11

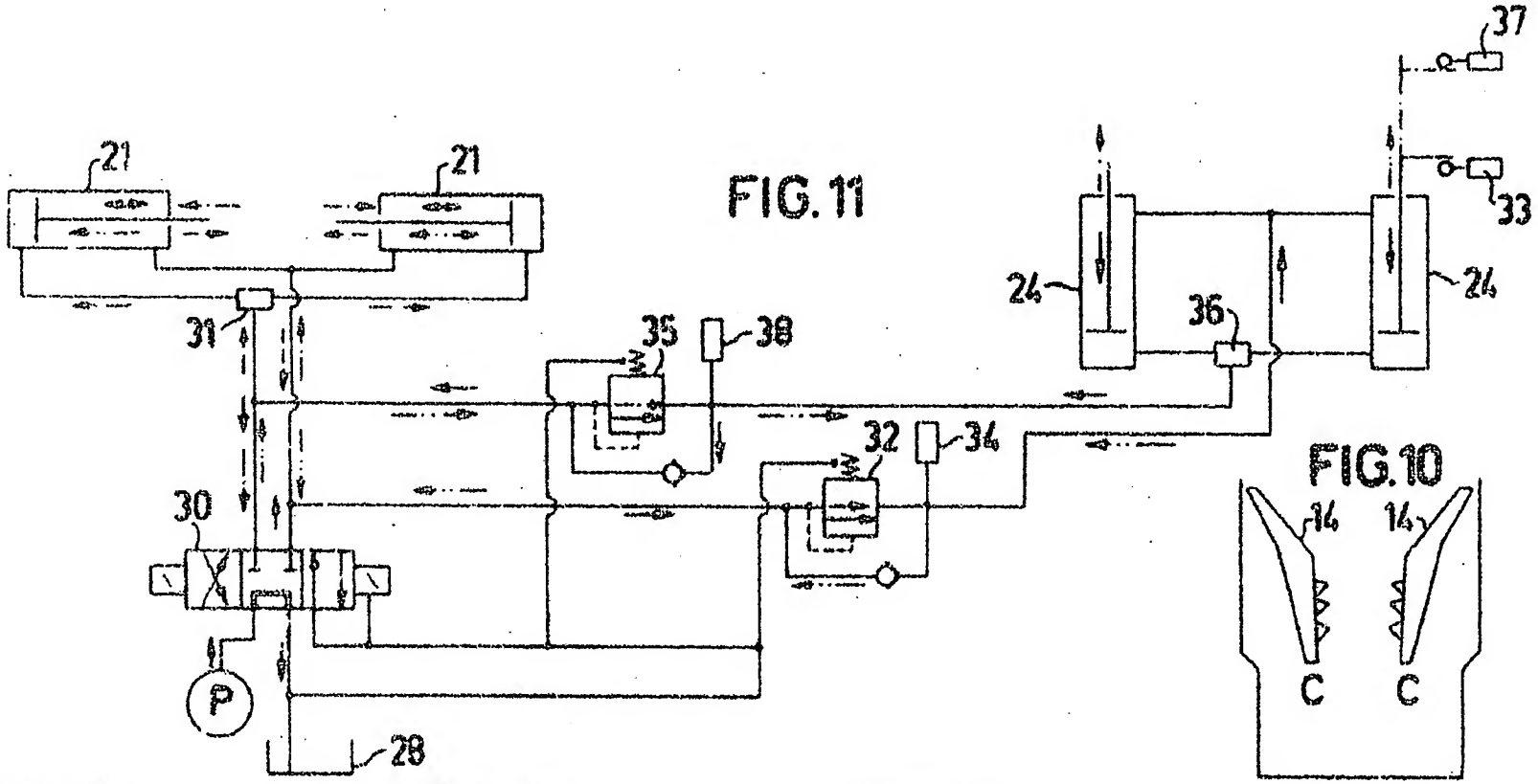


FIG. 10

FIG. 6

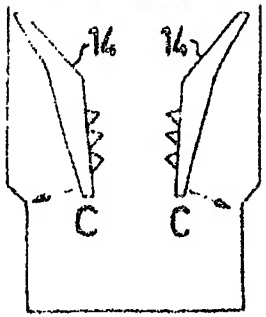


FIG. 7

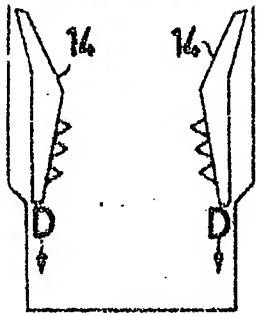


FIG. 8

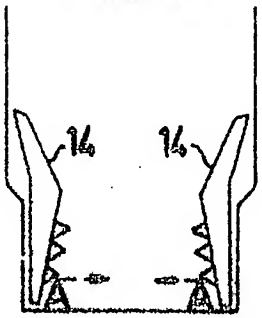
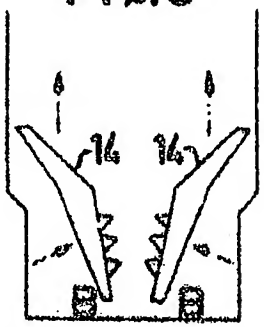


FIG. 9



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